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SCIENCE NEWS LETTER

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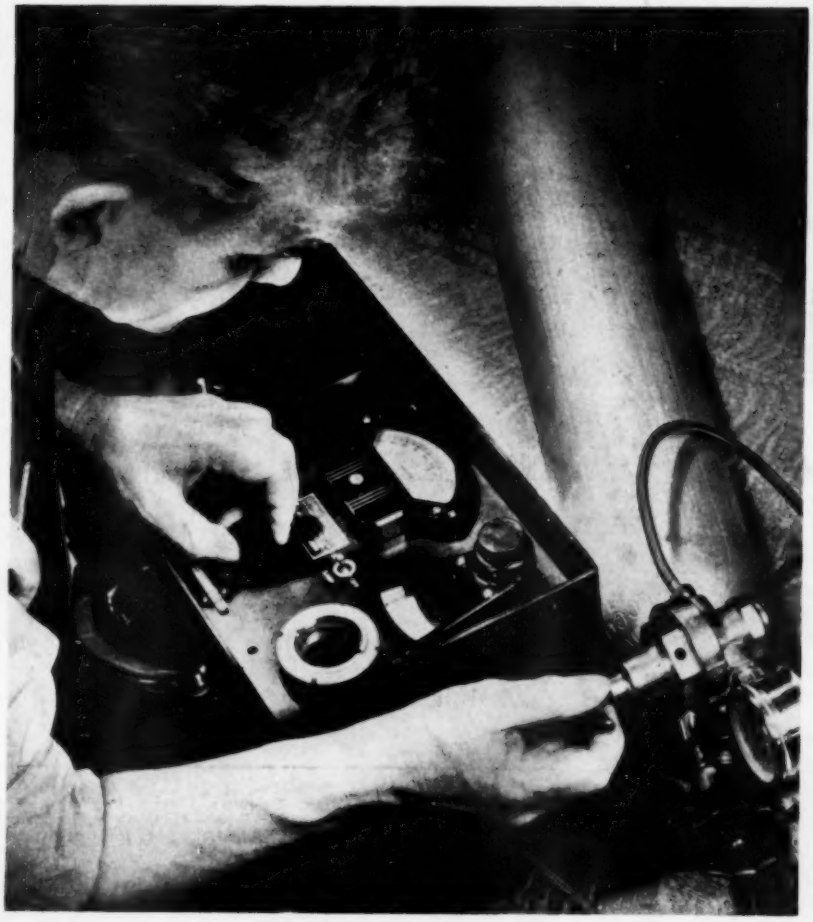
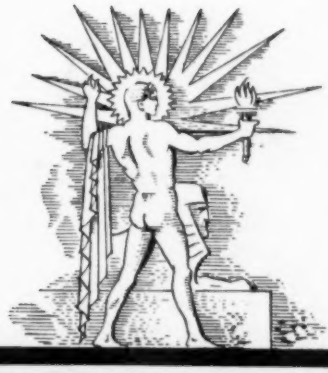
THE WEEKLY SUMMARY OF CURRENT SCIENCE •





September 16, 1939

Aids Airplane Safety

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A SCIENCE SERVICE PUBLICATION

Do You Know?

About 50 kinds of orchids grow wild in Britain.

A factory without windows being built for a Massachusetts company will have artificial lighting in 1,440 positions.

A recent accident victim in Rhode Island was identified solely by his eyeglass prescription.

Two boys were recently poisoned drinking tea made from Jimson weed berries.

Indians who taught Pilgrim housewives how to make succotash had a different name for it: mishkutotash.

Methyl bromide, useful as a fire extinguisher, is now "extinguishing" insects in a new fumigating preparation tested by government scientists.

Five specimens of the largest living carnivorous animal in the world, the great Alaskan brown bear, have been acquired by the American Museum of Natural History.

California's cantaloupe industry was once rescued from a fungus disease by crossing plants with a wild, almost inedible variety of cantaloupe from India, which could resist the disease.

A physician says that malaria affects one-third of the world's population, and renders the agricultural and industrial development of some of the world's richest regions practically impossible.

Mongolia has no railroads.

At one time in history roads were financed by charitable donations of pilgrims.

The development of an entirely new method of glass manufacture, resulting in ultra-low-expansion glass that rivals expensive quartz, is announced by a research laboratory.

Taking the rattle out of manhole covers has been achieved by a city engineer, who found the noise was due to irregular metal surface and remedied it by a smoothing-off process.

A dormouse makes three kinds of nests: one for shelter, one for a nursery, and one for hibernation.

Fifty-six pounds is the weight of one suit of armor, complete from head to foot, in a British collection.

A method of turning Irish potatoes into plastics has been developed by a German chemist now living in the United States.

When Peiping fell in 1937, all of the national universities there were moved to the interior, and 90% of the students went with them.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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SCIENCE NEWS LETTER

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CHEMISTRY

Now a Second Synthetic Rival For Japan's Natural Silk

Polyvinyl Acetal Resin is Material For New Fibers Claimed to be Strong, Elastic, Waterproof, Fireproof

ANOTHER synthetic resin fiber, that can be turned into lustrous silk-rivaling hosiery for Miss America's legs, was reported to the meeting of the American Chemical Society at Boston.

Known as polyvinyl acetal resin, the new fibers are further cause for headaches among the Japanese for they are synthetic, made-in-America rivals for Japan's natural silk. Silk is the largest single export of Nippon to Uncle Sam.

While chemists at the meeting heard the details of this newest plastic resin wonder, full information had already been disclosed, but little noted, in patents issued at the U. S. Patent Office in Washington during the present summer.

A research team of Carbide and Carbon Chemicals Corporation including Harold F. Robertson, Edward W. Rugeley, Theophilus A. Feild, Jr., John F. Conlon, C. O. Young and S. D. Douglas have been busily piling up patent after patent. Some of them have been issued in the near-record time of 2½ months.

Polyvinyl acetal resin can be produced in fibers as fine as natural silk, virtually as strong, more elastic, waterproof and fireproof.

The basic materials of the newest fibers are salt, coal, lime and air. Out of these cheap and plentiful raw materials are made high molecular weight (7,000 to 13,000) water-clear resins. The actual production consists of polymerizing vinyl halides with vinyl esters.

Many Possibilities

Among the suggested uses of the new fibers, besides the hosiery field, are: waterproof clothing, bathing suits, fireproof awnings silk-like in appearance, fishing lines, fishing nets and seines, acid and alkali-resistant clothing, electrical insulation and curtains for shower baths.

The new fiber material, to be known as "Vinyon," is not yet in commercial production for hosiery. In its properties it is comparable with "Nylon" developed by du Pont chemists, although the latter is made by a different chemical method.

Both fiber resins have been in the industrial "hush-hush" class because no technical details were ever released to the press in the pioneer stages of development and not until long after pilot stage of production had been reached.

Only by a week-by-week search of the voluminous Official Gazette of the U. S. Patent Office was the American press able to learn of these rumored but never-discussed developments.

Other Nations Active

Other nations have not been idle in developing comparable fibers made synthetically. Germany's famed chemical works, the I. G. Farbenindustrie is known to have a synthetic textile thread known as "Pe-Ce" which consists of a polyvinylchloride. This chemical is one stepping stone on which the Carbide and Carbon Chemicals Corporation chemists have polymerized the new Vinyon fiber.

The German fiber is thermoplastic, (molded with heat) and therefore cannot be used in clothing which requires ironing. It is extremely resistant to acids, however, and can be kept for 24 hours in aqua regia without harm. Fishery nets made of it will not rot on exposure to fresh or salt water.

Science News Letter, September 16, 1939

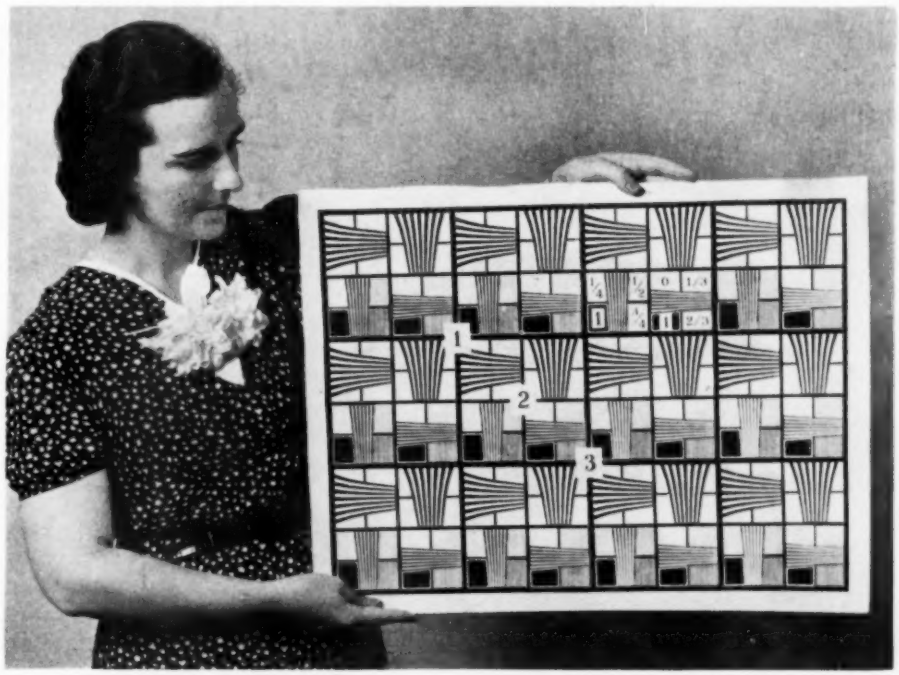
GENERAL SCIENCE

"Ersatz" Education Rules Universities in Germany

JUST as Germany is using large amounts of "ersatz" or substitute materials, such as artificial rubber and artificial wool made from milk, so "ersatz" university training has invaded the halls of learning to which in the days of the Kaiser youths of all nations went for scientific polishing and research baptism.

The Nazis have banished a large percentage of Germany's scientific brains. Even this may not be their greatest loss. If younger scientists were being trained effectively, the research and scientific services might be maintained successfully. But such does not seem to be the case.

Drastic and radical changes in the universities and technical institutes have been many, with more to come in the future. Most serious has been molding of



"EYE CHART" FOR TELEVISION

It doesn't look exactly like the Snellen charts used for your own eyes, but it is used by General Electric engineers to test the television eye and obtain proper detail in images.

the universities to fit the Nazi ideology. Reorganization and unification of study in various fields has been complete. To speed the production of doctors, chemists, and other immediately useful scientists, the period of study has been curtailed. Scientific work and practical training are being tied more closely together.

The armament boom in Germany has caused an acute shortage of qualified chemists, for example, although in the post-war period there was an oversupply of men academically trained in chemistry.

Coincidently with this pressure for technically trained personnel to serve the Nazi state and despite the need of research in building the Nazi war machine, there is a deep disdain for the intellectual worker and the researcher.

Nazi Secretary of Education Rust has told university professors to be teachers first and think less of their publications and research. Nazi Secretary for Propaganda Goebbels declares: "An intellectual is a man in whom civil valor is in inverse ratio to knowledge acquired through studies. . . . This intellectual is in reality an artificially highly bred accumulation of knowledge."

Science News Letter, September 16, 1939

CHEMISTRY

Find Cheaper War Gas and A Super-Elastic Thread

Nation's Chemists Survey Progress for Science Service; Cite Industrial Developments and New War Materials

A NEW, cheaper and easier way to make deadly wartime mustard gas.

The use of deadly, glass-eating hydrogen fluoride to bring about new reactions for producing new synthetic dyes and other chemicals.

A new kind of elastic thread made from new synthetic "rubber."

These are the three latest achievements in chemistry, that science which day by day builds new industrial achivements for peace and war.

No longer is American chemistry the stepchild of European laboratories as it was in 1914. It is almost self-contained, producing new wonders daily.

In Boston at the meetings of the American Chemical Society and each week in Washington through the clearing house of the U. S. Patent Office, the surge of research progress brings new chemical marvels.

Through a telegraphic survey of the chemical industry by Science Service, word comes from Dr. Gustav Egloff, research director of Universal Oil Products Co., that by the new dehydrogenation process, "ten per cent. of the available supply of natural gas in the United States, estimated at 2,500,000,000,000 cubic feet a year, can be converted into olefins for the production of super motor fuels and other useful and valuable substances."

From Commercial Solvents Corp., supplying chemicals to other chemical companies comes news of the commercial availability of a whole new class of chemical compounds derived through basic research by Prof. Henry B. Hass of Purdue University on the nitration of paraffin hydrocarbons.

"Several hundred derivatives of the nitroparaffins have been prepared in the laboratory," says C. L. Gabriel, manager of the market development division of CSC. "Initial production will cover but a small number of these."

Nitromethane and nitroethane are two of these products, however, which are important now because they can be converted into explosives.

Dr. C. E. K. Mees, research director of Eastman Kodak Co., pictures continual improvement of color photography for home motion pictures "through the production of organic chemicals of complicated structures which aid in sensitizing the film emulsions and in producing colors in the finished pictures."

In the chemical laboratories of Brooklyn's Polytechnic Institute two scientists, Donald F. Othmer and Donald Q. Kern have studied a new, simple way of making the chemical known as thiodiglycol, the starting material for the manufacture of mustard gas, most feared of all war gases which came into service during the World War.

Production of mustard gas during wartime by the German method (discovered in 1886 by V. Meyer) was costly, the Brooklyn scientists told the meeting of the chemists. The advance made by the new process is to speed the reaction of ethylene oxide and foul-smelling hydrogen sulfide. In the gas phase the reaction is slow but after dissolving in thiodiglycol the reaction goes swiftly, with yields amounting to almost the theoretical maximum to be expected.

The significant report of Othmer and Kern indicates the ability to assemble data suitable for manufacturing on a large scale.

Since World War days there have been recurrent rumors, never substantiated, of new and powerful chemical agents in warfare (as the U. S. Chemical Warfare Service chooses to call poison gases). But experts still believe mustard gas outranks all gases known in its wartime utility. A new and easier way of making mustard gas should make possible in case of need the world production of this poison gas far beyond its peak of the last war when at the Armistice 300 tons daily could be produced.

Hydrogen fluoride assumed a new role at the chemists' meeting. It can now serve as a superior catalyst for a host of vital organic chemical reactions. Pennsylvania State College's Prof. J. H. Simons summarized more than three years of research on the amazing ability of anhydrous hydrogen fluoride to act as a passive agent (catalyst) in making compounds like benzene, toluene and other "aromatic" compounds, react faster, easier and with greater yields with acids like acetic, with esters like benzyl acetate and other favored stepping stones by which organic chemists turn sticky black coal tar derivatives into brilliant synthetic dyes, high explosives, valuable drugs and other products.

Hydrogen Fluoride Catalyst

Prof. Simons hailed hydrogen fluoride as a preferred industrial reagent.

Not only can many intricate chemical syntheses be carried out more easily with the hydrogen fluoride catalyst, but reactions never before possible have been achieved, Prof. Simons stated.

"There are reactions that hydrogen fluoride promotes that have not been reported using other reagents," states Prof. Simons. "One of these is a reaction between an aliphatic halide and an olefin. Two examples are . . . the reactions of tertiary butyl chloride with trimethylethylene and with cyclohexene."

While much of the university research in chemistry has been saved for the chemical society's Boston meeting, the great chemical research parade of industry has been sweeping on, with the first hints of progress coming often from the

U. S. Patent Office in Washington. Industrial chemistry makes its progress behind the protection of patents, with a large company like du Pont getting 20 new patents in a three weeks' period as it did recently, during August.

Guarded behind this patent wall is the newest type of elastic fiber recently invented by Peter J. Gaylor of Elizabeth, N. J., and with patent rights assigned to the Standard Oil Development Co.

The new elastic fibers of synthetic rubber are ideal for elastic threads for clothing since they do not deteriorate rapidly in the fiber form. Even with the use of inhibitors and vulcanizing agents ordinary rubber in threads undergoes deterioration, says the Gaylor patent (No. 2,170,439). Laundering, dying and cleaning all add to its quick loss of elasticity.

The new rubber-like material is synthetised by the polymerization of isobutylene to create polymers having enormous molecular weights of 200,000 to 300,000.

The material can be extruded as a thread or as a flat sheet which can be cut into narrow strips. While in solution dyes may be added to give the rubber-like fibers various shades.

The rubber-like fibers can be coated with a covering of silk, cotton, wool and the various rayons and woven into an elastic cloth. Fabrics resembling the covering materials—but highly elastic—can thus be secured.

Science News Letter, September 16, 1939

GENERAL SCIENCE

"Those Guilty of Starting War Are Traitors to All Men"

By DR. WALTER B. CANNON

President, American Association for the Advancement of Science

Science Service asked Dr. Cannon as president of one of America's leading science organizations to comment on what war means to science and mankind. Dr. Cannon is professor of physiology at Harvard Medical School.

WHEN confronted by war we must remember that the most universal and persistent enemies of mankind are moral degradation, ignorance and the heavy forces of poverty and disease. Against these powerful foes every race, every nation should be willing to struggle with untiring zeal. Any victory over them is a benefit to all.

Those who are guilty of starting a war between human beings are traitors to all men for in war it is these same persistent enemies which will secure immensely increased advantages.

Brutal injustice, hatred and lasting bitterness spread through great populations and drive out feelings of mutual respect and good will. Disease and hunger and privations make devastating inroads until hosts of innocent people are swept away in pestilence. Vast resources which might be used to bring enlightenment, comforts and conveniences into the lives of the less privileged are appallingly wasted in wanton destruction. Seekers after new knowledge which might be serviceable in lessening human ignorance and in increasing human welfare are compelled to cease their free labors and concentrate attention on problems of military importance.

With tens of thousands of young men killed, there will be destroyed the lives of many promising leaders in the fight against the unresting enemies of mankind.

When the barbaric struggle is ended, these adversaries will still be ranged against us, more strongly entrenched than ever.

We who are not directly engaged in warfare against our fellows are favored by their opportunity to continue the fight against injustice, ignorance, disease and wretched poverty. We may hope that the progress we make in overcoming these ancient enemies we share in common will later be helpful to others less fortunate than ourselves.

Science News Letter, September 16, 1939

SEISMOLOGY

World's Earthquake Center Is "Somewhere in France"

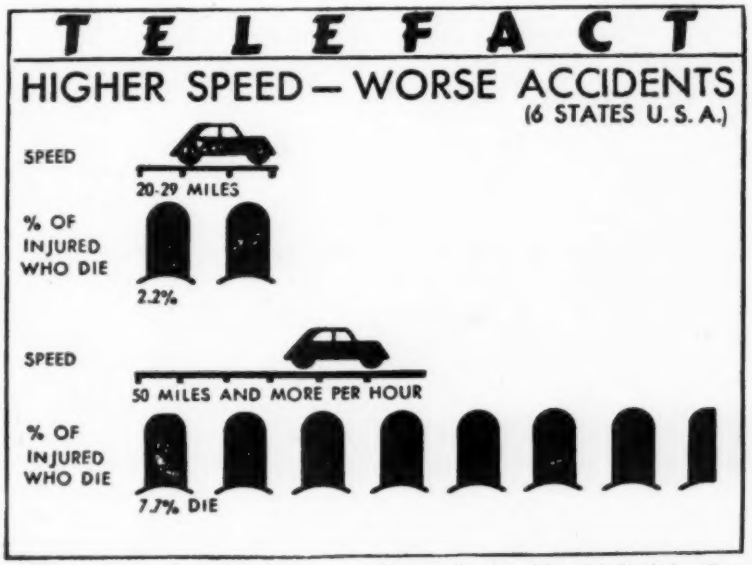
THE earthquake center of the world is now "somewhere in France."

Almost since the turn of the century Strasbourg has been the seat of the international organization for seismology where earthquake reports are sent so that there will be one place where all of Mother Earth's shivers and shakes (natural, not war-made) can be recorded. Dr. E. Rothé, long secretary of the world organization, removed his records and some instruments to an unannounced location farther from the German border.

Then he came to America for the international geophysical meetings, but he spent only one day here, hopping a return ship when the crisis deepened. All his assistants and sons are in the French army. He alone intends to hold the earthquake line for the internationalism of science.

Science News Letter, September 16, 1939

"Lost" fawns, small squirrels, rabbits, raccoons, and other small animals and birds are as safe in their native habitat as a child in its cradle and should not be removed, wildlife authorities say.



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PUBLIC HEALTH

Plagues to Come in War's Wake Microbiologist Predicts

Warring Nations Will Not Risk Use of Bacteria, President of International Congress Predicts

INFLUENZA is almost certain to be widespread again if there is a general war, it is predicted by Dr. Thomas M. Rivers, of the Rockefeller Institute for Medical Research and president of the Third International Congress for Microbiology meeting in New York City.

And no effective weapon yet exists for this plague. With the two of the four horsemen of the Apocalypse (war, famine, pestilence and death) riding again, scientists gathered from all over the world for the Microbiology Congress are making plans to outwit the third horseman, pestilence.

Microbes will play a tremendous part in the war that has now started in Europe, Dr. Rivers declared.

No one is going to start a war of microbes, Dr. Rivers said. That would be next to impossible. Epidemics of influenza, typhus fever, trench fever and dysentery, however, are sure to follow in the wake of this war as they did during the last world war. Meningitis and European sleeping sickness, technically termed epidemic encephalitis, may also appear.

Medical scientists are better equipped to fight some of these war-born plagues than they were in 1914, Dr. Rivers pointed out. Sulfanilamide, the new disease-conquering chemical, will not prevail against influenza or typhus fever, but it cures meningitis and gas gangrene, dreaded aftermath of war wounds. Serums also have been developed for fighting these deadly ailments.

The idea of using germs as a weapon of war is out on two counts. In the first place it is almost impossible for man to start an epidemic deliberately by releasing germs among a group of people or putting them into water or food. Not even cholera could be spread this way, Dr. Rivers declared. Many factors besides germs are needed to start an epidemic. Even in laboratories, where conditions can be controlled far better than in communities of men and women, it is difficult if not impossible to start an epidemic.

Second reason why germs will not be used as a weapon of war is that such a weapon would boomerang on the nation starting it. If an epidemic really got going, it would be impossible to prevent its spreading to people in the nation starting it as well as among their enemies.

Germs, Dr. Rivers said, neither recognize nor stop at the front line.

Science News Letter, September 16, 1939

GEOGRAPHY

Air Neutrality of Netherlands Protects Germany's Vitals

THE AIR neutrality of the Netherlands and Belgium, already cracking according to latest press dispatches, will let in an avalanche of trouble for Germany if it breaks down altogether. A glance at the map will show why.

Immediately behind the protecting dike provided by the neutrality of the Low Countries lies the greatest heavy-industries center of the Reich. Essen, the German Pittsburgh, is scarcely more than 30 miles from the nearest point on the Netherlands frontier—only five or six minutes, as the modern bomber flies. Krefeld, where the chimneys really begin to get thick, is less than half that distance. To the south, Cologne, key point on the Rhine railway lines that back the Westwall defenses, is quickly reached.

In that region, comprising the wide plain of the lower Rhine, there are areas scores of square miles in extent, where steel mills and chemical works crowd each other so closely that you cannot throw a stone without hitting something vital. The cities cluster edge to edge as they do where our Hudson river meets the sea. Even though their parks and streets and rooftops may bristle with anti-aircraft batteries they are still the most tempting kind of bomb-bait.

During the first few days of the new World War, British fliers have apparently respected the air neutrality of the two coastal nations. If they have infringed upon it at all, it has been only to the extent of carrying over loads of propaganda handbills.

However, should there be any violation of the Netherlands or Belgian boundaries from the east, or should the Nazis provide other provocation, the first thrust at Germany's industrial vitals could be made before German anti-aircraft could be extended into invaded territory. It would take time to drive back the Belgians, if experience in 1914 is any criterion; and in the Netherlands invading forces would certainly find themselves up to their necks (or deeper) in water let in by the dikes' defenders. Before they could get their new chain of listening posts and high-angle batteries set up, the British could be over Essen.

Furthermore, an invasion of Belgium would give the armies of France, now stymied against the Westwall between the Swiss and Luxembourg frontiers, just the chance they are probably praying for. The Westwall and the Maginot Line run parallel along the relatively short common frontier of Germany and France. At the Luxembourg "corner," however, they part company. The Westwall follows the Belgian boundary to the wide, swampy reaches of the Scheldt, while the Maginot Line follows the southern edge of Flanders to the sea.

If the Germans should come out from behind their Westwall onto the Flemish plain, it would be a safe bet that the French would leap out eagerly to meet them. There, between the fortified lines and the sea, they would slug it out like a pair of heavyweights.

And in the meantime the British bombers would be roaring high overhead, carrying steel to Essen.

Science News Letter, September 16, 1939

RADIO

Dr. George R. Harrison, director of the research laboratory, Massachusetts Institute of Technology, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, September 25, 4:30 p.m., EDST, 3:30 EST, 2:30 CST, 1:30 MST, 12:30 PST. Listen in on your local station. Listen in each Monday.

GEODESY—GEOPHYSICS

Poles Have New Superior Maps Not Available to Germans

Zone Mapped Covers Part of Poland Not Involved In First Fighting; Extends From Latvia to Hungary

NEW and better maps, which are probably not available to the German General Staff, are now in the possession of Polish military forces, it appears from the scientific report prepared by Polish scientists for the meeting of the International Union of Geodesy and Geophysics in Washington, D. C.

Poland sent only one delegate to the important science meeting because war has made it necessary for many delegates, high in government circles, to stay close to the conflict. The Polish delegate is Prof. Henryk Arctowski of Lwów University, a meteorologist.

The Polish report, made public at the meeting, tells of three years of research to improve the exact knowledge of Polish terrain, especially in the eastern provinces.

Of major military importance are the new superior topographic maps prepared for the Military Geographic Institute of Poland under direction of Chief Colonel Eng. T. Zieleniewski.

The new maps, partially incomplete, have only just become available and cover the whole zone of Poland which may soon come into the "front lines" if the Germans push Polish forces back, or if Russia somehow enters the conflict from the east.

The zone runs from the Lithuanian and Latvian frontier as far as the borders of Hungary and Roumania. All field work is complete and computation is nearly finished. Even though the maps may not yet be printed the data on them are available to the Polish General Staff.

Superior topographic maps showing detailed knowledge of terrain are of vital importance for military operations. A few feet of error in a map can nullify effective artillery fire and make good shelter out of what, on the map, appears to be an exposed position. The movement of troops and supplies too hinges vitally on an accurate knowledge of terrain.

Some of the world's greatest mapping projects, of which Great Britain's complete map of the whole of India is the prize example, have resulted from military necessity.

Poland planned to make an accurate topographic map of the western section of its country. But since the region is now in the war zone it has, of course, been abandoned.

Science News Letter, September 16, 1939

Robot Weather Stations

BETTER weather forecasting by a whole ring of robot weather outposts in the barren wilderness of Alaska and northwestern Canada is in prospect because of a tiny automatic weather observer and radio transmitter demonstrated at the meeting.

Developed at Harvard University's Blue Hill Observatory under the direction of Dr. K. O. Lange, the instrument, during the meeting, transmitted weather conditions from Mt. Weather in the Blue Ridge Mountains about 50 miles from Washington direct to the exhibition hall of the meeting.

Hourly air pressure, temperature, humidity, wind direction and velocity, and sunshine data were measured and sent by the tiny two-watt transmitter to the receiver and recorder 50 miles away.

The next stage will be automatic observation and transmission of weather from Mt. Washington, N. H., to Blue Hill Observatory, approximately 145 miles away.

Ultimate goal of the research is the spotting of the robot weather observer and transmitter in isolated but vital locations in the Far North where much of the nation's weather originates. There is no reason why the robot weathermen could not be placed on desolate islands in the Pacific and other oceans so that the world pattern of weather could be learned hourly.

Thomas Dickey, senior mechanical engineering student of Princeton University built the observer and recorder for Dr. Lange and Charles Pear, research assistant at Blue Hill, did the necessary radio work.

Science News Letter, September 16, 1939

The world's rayon production has shot up from zero to two billion pounds a year almost within a single generation.

ROBOT WEATHER STATION

Thomas A. Dickey, of Princeton, is demonstrating his robot instruments for automatic weather observation, to the International Union of Geodesy and Geophysics.

PALEOBOTANY

Plant Fossils Hunted In Chinese Shell Holes

IT'S AN ILL SHELL that blows nobody any good.

Shell holes blasted into China's ancient soil are being taken advantage of as happy hunting ground for fossils by missionary priests at the request of a scientific colleague, Rev. Gregory B. Mathews, professor of biology at the Catholic University of Peiping, now on his way back to China after two years of graduate study in the United States.

Father Mathews is interested in fossil plants of Coal Age date. Some of the toughest fighting between Japs and Chinese has been over terrain underlain with fossil-bearing Coal Age shale and slate deposits, into which the heavy shells blew nice, big holes, exposing ancient imprints of leaves and stems.

So as the missionaries go about the country in their efforts to relieve some of the miseries of the war, they take a little time out occasionally to drop into a shell hole and do a little fossil-hunting.

Science News Letter, September 16, 1939

CHEMISTRY

Preparations for War Boom German Chemistry

PREPARATIONS for the war boomed German chemistry which, since before the World War, has been one of the nation's most powerful industries.

German chemical companies are paying dividends as high as 15 per cent. according to the latest survey prepared by the U. S. Bureau of Foreign and Domestic Commerce in Washington from data gathered by vice-consul C. M. Gerrity, Frankfort-on-Main.

I. G. Farbenindustrie A. G., largest and best known of the chemical combines (controlling 40 per cent. of the output) paid 8 per cent. on its common stock.

Some 582,000 people are employed by Germany's chemical industry in its broadest sense, including mineral oil, rubber and synthetic rubber plants. The average working day for chemical employees is 7.89 hours.

Figures now complete for 1938 show that the United States exported to Germany 28,000,000 marks' worth of chemical materials, an increase over 1937.

In contrast Germany's chemical exports to the United States dropped to 40,000,000 marks from 62,000,000 marks in 1937.

The newest chemical research discoveries and developments of Germany listed by the Bureau of Foreign and Domestic Commerce include:

Substitutes for linseed oil, tung oil, copal and natural resins.

Collapsible tubes (for toothpaste and the like) made of plastic materials instead of metal.

Food containers made of acetyl-cellulose.

A new acid iron smelting process using soda ash.

The precipitation of casein from milk by the use of pectin.

A new fertilizer containing 20 per cent. nitrogen and 28 per cent lime.

Colored asphalt roads whose surface can be made red, green and yellow permanently.

Science News Letter, September 16, 1939

ARCHAEOLOGY

Find Indian Buried Under 400 Arrows

A PREHISTORIC Indian buried under 400 arrows, and honored by hundreds of offerings piled into his tomb, has been discovered by archaeologists exploring a small pueblo 20 miles east of Flagstaff, Arizona.

The burial, which occurred seven hundred years ago, is pronounced an important archaeological discovery by Dr. Harold S. Colton, director of the Museum of Northern Arizona, reporting the find.

Articles bestowed on this unknown figure of American prehistory include: 25 undamaged jars and bowls; a round basket covered with turquoise inlay made of more than 1,500 stones; two turquoise earrings inlaid with shell; a wand with inlaid turquoise end; thousands of shell and stone beads; rattles; shell tinklers; red, green, and blue paints; sticks carved with human hands and hoofs of deer; abalone shell brought from the Pacific coast. Many objects are damaged by moisture.

As a tomb for this Indian, a chamber had been excavated under the floor of an abandoned room. After the gifts were placed with the body, Indians had thrown 400 arrows on top and roofed the chamber with juniper poles and a covering of trash.

The tomb was discovered by an expedition of the Museum of Northern Arizona led by J. C. McGregor of the Museum, in cooperation with WPA. Finding the burial is credited to Milton A. Wetherill, assistant archaeologist.

Science News Letter, September 16, 1939

IN SCIENCE

CHEMISTRY

American Chemists Receive Invitations to Warsaw

AS WARSAW was being bombed by German airplanes, American chemists were receiving by mail beautifully printed invitations for the 19th Congress of Industrial Chemistry scheduled to be held in Polish capital, Sept. 24 to Oct. 1.

Ironic words: "The organizing committee wishes the foreign representation to be particularly distinguished . . . To aid this, there will be no dues to be paid by members of the Congress . . . Visas will be granted free of charge by the Polish government."

The first principal scientific paper of the Congress was to be delivered by Prof. Max Bodenstein of the University of Berlin.

Science News Letter, September 16, 1939

VETERINARY MEDICINE

Hydrogen Peroxide Rids Dogs of Parasitic Worms

DOGS can be rid of parasitic worms by treatment with hydrogen peroxide, common household chemical used for varied purposes from hair bleach to mild antiseptic. Discovery of the chemical's new usefulness was made at Alabama Polytechnic Institute by Leon F. Whitney, research student in the department of veterinary medicine. (*Veterinary Medicine,* September)

Mr. Whitney introduced the peroxide solution into the animals' intestine by means of a tube. It was usually given warm, in dilutions as weak as one and one-half per cent, after the dogs had been kept without food for from four to 36 hours.

In practically every case, a single treatment resulted in a 100 per cent clearance of all parasitic worms, even including the hard-to-kill tapeworm. Postmortem examination of dogs from the public pound showed no living worms left in their intestines, and also gave no indication of harm to the dogs' own tissues. The treatment has now been used on a number of valuable dogs, with highly favorable results.

Science News Letter, September 16, 1939

NCE FIELDS

PHYSICS

Cosmic Ray Research Leader Comes to United States

THE procession of intellectual refugees whose brains enrich America lengthens. This time it is Dr. Bruno Rossi, a leader in cosmic ray research, who becomes research associate in physics at the University of Chicago.

For almost a thousand years his family had been in Italy, but the Italian governmental decree of September, 1938, (Mussolini aping Hitler's "race" antagonism) forced him from Padua's new institute for atomic and nuclear physics, which he planned and supervised. His wife is the granddaughter of Cesare Lombroso, famous anthropologist.

Now Dr. Rossi's brilliant research will blend with that of Chicago's Nobelist Arthur Compton.

Science News Letter, September 16, 1939

PSYCHIATRY

Lessons in Happiness From Mental Disorder

INSTEAD of worrying fruitlessly about war alarms, crises, threats of dictators and economic ills, Americans would do well to encourage psychiatric research and to learn the lessons it teaches. This suggestion was made by Dr. Adolf Meyer, professor of psychiatry at the Johns Hopkins Medical School, at the dedication of the new Psychiatric Clinic building named in his honor at the Rhode Island State Hospital for Mental Diseases.

Mental illness or disturbance might, Dr. Meyer pointed out, be called "the undeclared war of persons and social forces of mental nature."

Many of these forces, he said, are transient and pass by. Others are deep and long-continuing. For the most obvious ones we have such carefully planned agencies for health and happiness as hospitals and clinics for mental sickness. But none of these mental disturbances should be considered as exceptional, mere side issues to be hidden away, Dr. Meyer warned. We should think of them in "terms of real life and not only in terms of microscopes and test tubes, but in terms of strain and stress, which we have to recognize in the life of every day.

"Few people see life as it is and fewer see the deeper hazards at work," he pointed out.

Even without the threat of war, Americans need much knowledge of human nature and its capacities in seeking to reestablish economic and social conditions and they need understanding for self-help and joint efforts.

"Humanity has to meet serious problems and difficulties. If we want to create a safe ground for democracy and for a 'fair deal' and not merely just a 'new deal' kind of life and government," Dr. Meyer said, "we have to learn much from the revulsion of nature seen in what costs us thousands and thousands in money and much more in anxiety and derangement of mind and happiness."

Science News Letter, September 16, 1939

RADIO

Hot-Cold Air Boundaries Cause Radio Reflection

THE HOME of the world's weather—the zone of atmosphere just above the surface of the earth where warm and cold air masses intermingle to produce rain, clouds, and hot and cool spells—has now been shown to act as a mirror for radio waves.

Two American scientists, Prof. R. C. Colwell and A. W. Friend of the University of West Virginia, describe their studies of radio reflections at the sharp boundaries between hot and cold air layers. (*Nature*, July 1)

The radio mirrors are not at extreme heights of scores of miles in the ionosphere at the place where radio reflections are commonly known to occur. Rather they appear to come in the troposphere at altitudes no greater than a mile and a half or about 9,000 feet. Some seem to occur as low as 6,000 feet.

Three years ago such reflections were suggested by the scientists from radio measurements alone. Now they give, side by side, a comparison of the radio reflections and the existing height of the layers of temperature inversion in the troposphere.

Airplane flights directly over the experimental radio transmitter used in the tests during the times of the experiment furnished accurate, conclusive proof of the equal heights of the sharp temperature boundaries and the place of radio reflection.

Science News Letter, September 16, 1939

LANGUAGE

Those Polish Names! They Can be Pronounced

POLISH names in the news are a challenge to the tongue, but even names ending in "szcz" can be spoken. Try it.

Danzig, for an easy start in Polish, is "don-tsik."

Accent all Polish names on the syllable preceding the final one.

The capital Warszawa, is "var-shava." Krakow, ancient Polish capital, is "kra-kuf."

Cz is pronounced like "ch" in chain. Dz at the end of a name is like "ts." Rz is like "zh." Sz is like "sh." C generally has a "ts" sound. Final w gets an "f" sound, and w elsewhere in a word sounds like "v."

Now try a harder name: Bydgoszcz, a city not far south of the Polish Corridor, pronounced "bid-goshch."

The name for the Corridor is Pomorze. You can now figure out the pronunciation yourself.

Here are pronunciations of Polish towns in news reports of bombings and German attack:

In line of German advance from East Prussia are Mlawa (mwa-vah), Dzialdow (jya-wof), Ciechanow (tsyeh-ka-noff; gutteral k).

In line of attack in direction of upper Silesia in southwest Poland are Katowice (kat-o-vee-tseh), Czestochowa (chen-stow-kho-vah).

In line of attack from west in Corridor is Chojnice (koi-nee-tse; gutteral k).

Targets for air raiding have been Gdynia (g'din-ya), Tczew (tchef), Grudziaz (grooh-jyonts; with nasal ending), Katowice and Czestochowa.

Science News Letter, September 16, 1939

METEOROLOGY

War Kills International Weather Service from Europe

ONE of the first scientific casualties of the war has been the international weather news, which used to be assembled from all the countries of Europe. The practice was to make a compilation of this in England, transmit it to Canada, and thence to the United States. Even after the outbreak of hostilities on the Polish border this was kept up for a day or two. Now it has stopped altogether. Not even news of weather in neutral countries is coming through.

Science News Letter, September 16, 1939

ORDNANCE

Rockets For Tomorrow's Warfare

Self-Propelled Projectiles May Take Over Parts of Functions Now Performed by Artillery and Aircraft

By DR. FRANK THONE

CITIES of what we used to call the civilized parts of the world now cower beneath the looming menace of raiding airfleets that may ride out of tomorrow's dawn (or tonight's dark) to kill and demolish with TNT, gas, and flame bombs.

A new horror can be added to the infernal *Ragnorak* that now impends. Rockets, that we have always known merely as pretty things to shoot up into the sky on Fourth of July nights, may presently come plunging out of that sky like the meteors of Judgment Day, laden with tons of flaming, explosive death.

This is not a fantastic dream of a Wellsian imagination. It is a definitely calculated possibility, backed by the cold figures of ordnance engineering.

In the professional journal, *Army Ordnance,* an officer of the U. S. Army Ordnance Reserve, Major James R. Randolph, has set forth the military possibilities of rockets as they exist at present and as they may be expected to become practical in the fairly near future.

Long-Range Bombardments

Major Randolph sees rockets as capable even now of long-range bombardments: "In the present state of the art, there probably would be no great difficulty in equaling with rockets the performance of the German long-range gun that bombarded Paris from a distance of 75 miles. But instead of firing shots of moderate caliber at long intervals, a rocket plant could fire the equivalent of 24-inch shells about as fast as desired. Such a job would be no more ahead of present practice than war-time bombing raids were ahead of the airplanes of 1913."

The shells of the long-range gun that bombarded Paris had a caliber of only eight inches or a little over, and weighed about 700 pounds. A 24-inch shell would weigh in the neighborhood of four tons!

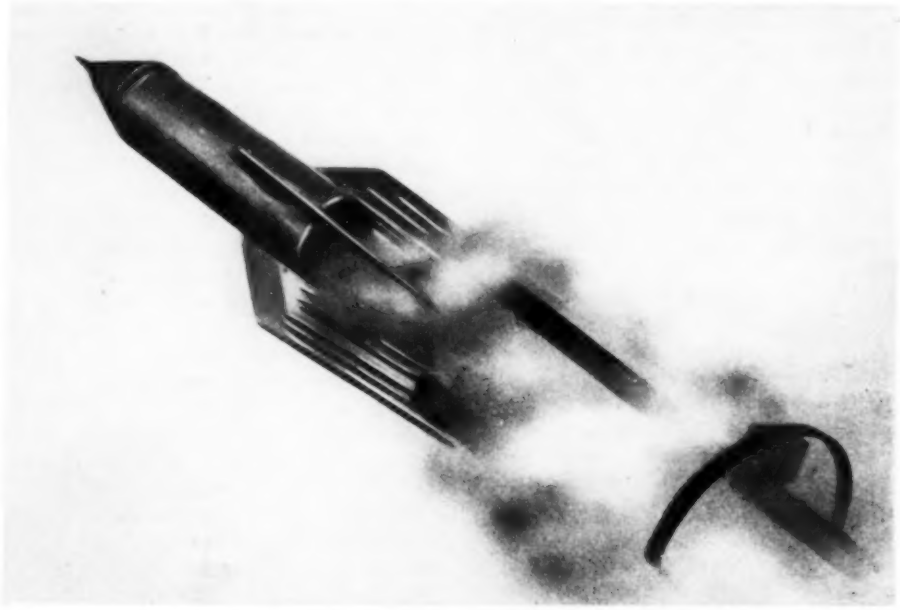
Potential range of such bombarding rockets is much greater than that of any imaginable gun. Theoretically at least it would be possible to fire rockets clear across the ocean, and bombard New York from Berlin. The practical limits would be the enormous cost of such super-rockets and the difficulty of hitting the target. Even at 75 miles, Paris proved a hard mark for the Prussian gunners to hit; and rockets are subject to the same factors of inaccuracy as projectiles from guns.

For very long flights, as in possible transoceanic rockets, Major Randolph thinks that human pilots will be carried. It will not be necessary to recruit suicide squads for this purpose. After they have guided their deadly space-ships close to the doomed target, the pilots can escape in parachutes or small planes, make a landing, and either surrender as prisoners of war or slip off into the country to start forest fires, cut communication wires, and generally raise individual hob until tracked down.

The very lack of accuracy, in unmanned bombarding rockets, is one element of their terror. One of the things that gave Parisians the jitters was that they never knew where or when the next one of those infernal Boche shells would burst. It would be very fine (from the attacker's viewpoint) if all hits were made on arsenals, munitions works, railway stations and similar targets. Even the citizen could take some comfort in that, for he would know what places to avoid. But when a truckload of hell may be dumped into his own unimportant back yard at any moment, and without benefit of air raid warnings—well, it isn't good for civilian nerves.

Distinction must be made between the hundred-mile shots which Major Randolph thinks could be made with relatively little change in existing rockets, and the thousand-mile shots (maybe cruises would be the better term) that may be managed at some future date. Engineering principles are already known that would make such long flights possible, but as yet we lack materials that will withstand continued exposure to the temperatures and pressures necessary in the propelling blast.

There are also problems connected with fuel, that haven't been licked yet. Successful experimental rockets, like those on which Dr. Robert H. Goddard of Clark University has been conducting his researches, are powered not with the gunpowder of the familiar Fourth-of-July rockets, but with a liquid fuel such



PORTENT OF THE FUTURE

Something like this may come roaring through tomorrow's murky skies, laden with death and destruction.

VERTICAL FLIGHT

Dr. Goddard tests a small rocket for efficiency of devices intended to insure true flight.

as gasoline, which is made to burn more intensely by supplying liquid oxygen instead of ordinary air.

Liquid fuels and munitions don't appeal to the soldier. They're extremely bothersome to handle under rough field conditions. Military men would far rather have nice, well-behaved solids, that can be turned upside down without spilling, and that won't promptly leak out if the container gets cracked. But they would be willing to put up with liquid fuels for long-range rockets, Major Randolph thinks, if the rockets will gain them sufficient tactical advantages.

War rockets will not be confined to giant sizes and extreme ranges. Major Randolph suggests several ways in which they may be used at the front itself. Their great advantage lies in the fact that they need only a light tube for their launching, and hence can go places and do things that are impossible to ordinary cannon because of their great weight.

Rockets can be taken closer to the front, it is pointed out; moreover "they can be carried by men, by horses, by dog sled, or by canoe through regions where wheeled vehicles cannot go."

Rocket barrage firing would be very different from the conventional field artillery bombardment, Major Randolph points out:

"The fact that the rocket's firing device would probably cost less than one per cent. of the cost of an equivalent cannon would enable a much larger number to be fired at once, and certain other characteristics of the rocket would require it.

"When a fortified position is to be reduced by cannon, the bombardment often lasts for several days, giving the enemy ample time to bring up reenforcements. With rockets, the whole artillery preparation would probably be shot off at once, or in several volleys.

Battle, and Sudden Death

"The enemy would think himself safe in a quiet sector; his men would be out of their shelters and off their guard; then suddenly a whole bombardment of rockets would come plunging down on them, followed immediately by the attack."

Nor would rockets seek their targets only on land. Major Randolph believes that they could considerably simplify the problem of coast defense, "providing a weapon comparable in effect to the heaviest cannon, yet a great deal easier to move from place to place.

"Where a 14-inch railway gun on the move is identified readily by hostile aircraft, an equivalent rocket on the move probably would be riding in an ordinary motor truck, indistinguishable from ordinary civilian traffic."

Even more interesting is the picture offered of possible rocket-carrying naval ships: "Armor-piercing rockets, equal in power and range to a 16-inch gun, probably could be mounted on submarines, destroyers, and other small craft, making them a much greater menace to the battleship than they now are."

It would not be necessary for naval rockets to be armor-piercing. They could be fired to strike a little short of the target, so that they would plunge and explode below the armor belt, giving a torpedo effect.

In their more natural element, it is also possible that rockets might be employed for anti-aircraft defense. One of the drawbacks about using guns of large caliber against aircraft is the difficulty of aiming a heavy piece at a rapidly moving target. But the launching tube of a 300-pound rocket can be swung about more easily than an anti-aircraft cannon firing a shell weighing only a twentieth that much; and of course the bigger charge could burst much farther off its flying target and still score a knockout.

Advantages Over Cannon

In all of its suggested uses, the rocket has two considerable advantages over the cannon. First, it keeps its velocity throughout its whole flight, until the propelling charge in its base is burned out. The shell, on the other hand, is going fastest when it leaves the gun muzzle, and is slowing down throughout its trajectory, so that it is going at its slowest when it strikes.

The rocket's second advantage is that if there is any part of the propelling charge left when it strikes, this can be so arranged that it will explode, adding its effect to that of the bursting charge in the rocket's nose.

Major Randolph does not imagine that rockets will take the place of artillery altogether. For many military purposes, the reign of King Cannon is still firmly established. But as in the World War, the jobs once performed by artillery were taken over in part by trench mortars, airplane bombs, Livens projectors and even hand grenades, so in any future war it is likely that rockets will find their part to play in the great orchestra of havoc.

Rockets are not a new thing under the red sun of Mars. They were used, with considerable effect, by the English during the Napoleonic wars. The rockets of that period were the invention of Sir William Congreve; later on, an improved type known as the Hale rocket was adopted in the British army.

The Congreve rocket was called into being by almost the same considerations that are causing military men to consider it today. The artillery of the period was heavy, difficult to move, and could not keep up with troops as they went forward in battle. The Congreve rockets, though not very accurate, could obtain considerable artillery effect, and their light tubes could be taken right along with the infantry. It had the further ad-

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Information collected by Science Service from seismological observatories resulted in the location by the U. S. Coast and Geodetic Survey of the following preliminary epicenter:

Friday, Sept. 8, 7:04.8 a.m., EST

In the North Pacific, near the Aleutian islands. Latitude 52 degrees north, longitude 175 degrees east (approximately). A strong shock.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see SNL, June 17.

vantage of being able to carry a bursting charge, whereas the cannon of that day fired only solid projectiles.

The Congreve rocket is permanently memorialized in our national anthem. In 1813, British frigates were equipped with these rockets, and when their fleet attacked Fort McHenry on Baltimore Harbor, one anxiously watching prisoner on a frigate deck caught glimpses through the night of a flag, still defiantly flying, by "the rockets' red glare."

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Science News Letter, September 16, 1939

GEOGRAPHY

Airplanes Raise Question Of How High Neutrality Goes

UNKNOWN airplanes roaring high above neutral Holland raise the question how high neutrality extends. Legally the limit of ownership is as high as up—beyond the sky is the limit. But the famous three-mile limit for ships at sea was set as the limit of shore big guns.

The highest up of anti-aircraft guns, a practical limit of neutrality, is about 40,000 feet or eight miles. Will that become the usage if not the law?

Science News Letter, September 16, 1939

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MICROBIOLOGY

Bacteriology of Foods Extremely Important in War

Botulism Can be Prevented by Cold Treatment in Foods Too Delicate For Ordinary Heat Processing

"FOOD will win the war!"

That slogan, heard in the close-rationed days of 1917-18, will become loud again with war raging in the present-day world. Micro-organisms in relation to food and its storage therefore occupied an appropriately prominent part in the Third International Congress for Microbiology meeting in New York City.

Most important of the bacteria to be guarded against is the species *Clostridium botulinum*. This is not a food spoiler; it leaves the food in which it lurks innocently inviting—and strikes the eater with an always severe and sometimes fatal food poisoning afterwards.

A three-man research team from the University of Illinois, Drs. F. W. Tanner, P. R. Beamer and C. J. Rickher, told of their investigations on certain food products liable to infestation with this dangerous organism, which are spoiled for market purposes if they are given sufficiently severe heat treatment to destroy the bacteria. Fortunately, however, it was found that the same foodstuffs could be adequately preserved by cold against the deadly Clostridium.

From far-off Japan came a report of research on sea foods, by Dr. Yuzo Tohyama of the University of Tokyo. Characterizing his people as "the first rate fish eating nation in the world," Dr. Tohyama related how he has used more than 200 different chemicals in his search for effective means to find a disinfectant that will clear fish, shellfish and other sea foods of disease-causing and spoilage-producing bacteria and still leave them palatable and wholesome for human consumption.

Bacteria in foods are of course not always spoilers or poisoners. Dr. N. E. Gibbons of the Canadian National Research told of the role played by bacteria in the curing of the famous Canadian bacon. The bacteria swarm thickest just where the pickling fluid makes contact with the meat, and it is at this interface, Dr. Gibbons believes, that they do most of their beneficial work.

War Against Germs

MAN'S chemical warfare against the germs that invade his body occupied a leading part in discussions. Especial prominence was given to the powerful new weapons, sulfanilamide and its related chemicals.

Just how sulfanilamide acts against bacteria is still pretty much of a riddle, it was admitted by Drs. Eleanor A. Bliss and Perrin H. Long of the Johns Hopkins Medical School. It has been known for some time that in the presence of small quantities of the chemical, germs of the group known as cocci are not killed outright but stunned or paralyzed, so that the body's own fighting forces can make an end of them. However, in the researches reported by Drs. Bliss and Long, it has also been shown that stronger concentrations of sulfanilamide kill the bacteria outright.

Another point developed was that the effectiveness of certain compounds of sulfanilamide seems to be due to their chemical decomposition, releasing "straight" sufanilamide in contact with the bacteria.

Experiments in which sulfanilamide and sulfapyridine were used, either alone or in combination with injections of immune sera, on mice exposed to infection with meningitis were reported by Dr. Sara E. Branham of the U. S. Public Health Service:

"In general, it may be said that, weight for weight, sulfapyridine protected mice better than sulfanilamide, and that the combination of either sulfapyridine or sulfanilamide with serum gave better protection than either the drugs or the serum did alone."

Vitamins for Microbes

THE SMALLEST plants, no less than the largest animals, must have their vitamins, hormones and other minutely concentrated but physiologically powerful substances if they are to live and grow, it was made plain in discussion be-

fore the Congress. Not less than a dozen such substances are needed, said Dr. William J. Robbins of the New York Botanical Garden. To a very large extent, microscopic plants and full-sized animals need and use the same growth-promoting substances.

One such substance, only recently discovered, was given the name "coenzyme R" by Dr. Franklin E. Allison and Francis W. Minor of the U. S. Department of Agriculture. It has been found indispensable for the growth of the nitrogen-fixing bacteria that live in the roots of clover, peas and related plants. The bacteria need very little of it; they would grow and multiply in solutions containing as weak a dilution as one part in a million. But that much at least they had to have in order to grow at all.

Other bacterial growth-promoting substances, necessary in equally minute minimal quantities, were described by Drs. P. W. Wilson and P. M. West of the University of Wisconsin. They found the same substances present in yeast as well as bacteria.

Another nitrogen-fixing bacterium, Azotobacter, that lives free in the soil instead of in plant roots, has been found to require minute traces of molybdenum, the same metal that is used in hardening modern high-grade steels, and even smaller quantities of tungsten, the metal used in electric lamp filaments. Researches establishing these facts were reported by Drs. Dean Burk and Kenneth Horner of the U. S. Department of Agriculture.

Linked With Rheumatism

RELATIONSHIP between rheumatic fever and pneumonia has been traced by Drs. Homer F. Swift and Thomas MacPherson Brown of the Rockefeller Institute for Medical Research, they reported.

Exudates oozing from the tissues of sufferers with rheumatic fever were cultured in various ways, both in the lungs of mice and on the embryonic membranes of incubated eggs. On the membranes the cultures produced characteristic lesions, and in the mice they caused pneumonia.

Microscopic examination disclosed the presence of the extremely small microorganisms known as pleuropneumonia bodies, which seem to have a size between the smaller types of bacteria and the invisible filterable viruses. Indeed, under certain circumstances the pleuropneumonia bodies themselves will slip

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through the invisibly fine pores of porcelain filters.

Two other strains of filterable organisms of the pleuropneumonia type, found in mice, were reported on by Dr. Albert B. Sabin, also of the Rockefeller Institute. Strain A, which thrives either in the brain or in certain other tissues of the body, produces a toxin that either kills outright or leaves the animal crippled with symptoms like those of chorea. Strain B "has an almost specific affinity for the joints, in which it gives rise to a chronic, progressive, proliferative, ankylosing arthritis which clinically and pathologically resembles rheumatoid arthritis in man."

Danger to Unborn Babies

VIRUS diseases like smallpox, influenza and infantile paralysis may carry a special menace to unborn babies, Drs. N. Paul Hudson and Oram C. Woolpert of Ohio State University pointed out. Recent experiments have shown that viruses of many types can be raised in the laboratory on the embryonic membranes of incubated eggs when they will not grow on non-living culture media, they stated. In a similar way, the two Ohio researchers have made use of the unborn young of animals like guinea pigs. This has suggested to them the possible pre-birth dangers that may lie in wait for the young of the human species, to whom viruses could be carried in the mother-to-child circulation.

Rabies Virus Cultured

FROM the Far East and the Near East came simultaneous reports of a bacteriological feat long considered impossible: the growing of the virus of rabies in glass laboratory flasks instead of in the brains of living animals. Prof. K. Kanazawa of the University of Tokyo made the deadly stuff grow by feeding it minced brains of either rabbit or chick embryo. In experiments of Prof. I. J. Kligler and Dr. H. Bernkopf of the University of Jerusalem, it was grown on a medium consisting of coagulated human blood plasma and mouse embryo brain. Raising of rabies virus in this way will make easier the work of those who are striving to save both men and dogs from the ravages of this terrible disease.

Jekyll-and-Hyde

BACTERIA and other forms of microbes are changeable creatures. Some of their Jekyll-and-Hyde shifts were described by Dr. Hobart A. Reimann of Jefferson Medical College, Philadelphia. He told of a strain of meningitis germs which he isolated from a patient and kept in culture for four years. At the outset, masses of it growing on nutrient media were white. In time, however, he isolated four sub-types that displayed color, and from each of these in turn were developed still further variations.

Yet not all bacteria are thus unstable. Dr. J. Howard Brown of the Johns Hopkins Medical School told of strains of the dangerous streptococcus which he has kept for many years without any detectable change. Some cultures were kept dried in a vacuum, for as much as twenty years; at times, however, they were brought to active life on culture media and run through series of many transfers from one tube to another. Through it all they have remained true to type.

Arsenic Poisons Germs

ARSENIC compounds may take their place alongside of sulfanilamide as weapons against infecting bacteria. Drs. S. M. Rosenthal and Hugo Bauer of the U. S. Public Health Service related results of their tests on certain aromatic arsenic derivatives, on mice with micrococcal infection. A compound known as p-nitrobenzoic acid, and some related compounds, were found especially effective.

Virus Inhibitors

VIRUS diseases of plants, like leaf mosaic, curly top and "frenching," can be prevented under laboratory conditions by treating the virus with certain substances before it is inoculated into the plants. Whether this effect is due to something that happens to the virus itself or something that happens to the plant has been a moot question with plant pathologists.

Dr. James Johnson of the University of Wisconsin told of experiments in which it was indicated that the effect is due to direct action on the virus. Substances used ranged from cow's milk to pokeweed juice. Even when used in concentrations so low as to be unlikely to affect the plant, they still had an inhibiting effect on the viruses.

Trichinae in Swine

TRICHINAE, the muscle-boring parasites that cause painful and occasionally fatal illness in eaters of inadequately cooked pork, are widely distributed in the United States, stated Dr. Benjamin Schwartz of the U. S. Department of Agriculture. In grain-fed swine, however, they are not nearly as abundant as in those fed on garbage. On the basis of thousands of examinations of slaughtered animals, Dr. Schwartz gave the percentage of trichinae-containing carcasses as less than one, for grain-fed hogs, whereas it was 5.7 in garbage-fed hogs. The vast bulk of hogs slaughtered in the United States, Dr. Schwartz added, are grain-fed.

Skin a Maginot Line

EFFECTIVENESS of the human skin as a Maginot Line against bacterial invasion was dramatically demonstrated in experiments by Drs. Marshall W. Jennison and Irwin W. Sizer of the Massachusetts Institute of Technology.

They swabbed broth containing millions of living bacteria on the inner skin of the forearm, and then at intervals took swabbings off again and tried to grow germs from them. No viable bacteria could be recovered after the skin had naturally dried, which took about four minutes. Only when the tough, resistant resting spore stages of other bacteria were placed on the skin was survival possible.

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Rabbit Fever in Japan

A FORM of rabbit fever known as "yato-byo," similar to the tularemia known in the United States, exists in Japan, reported Dr. Hachiro Ohara of the Fukushima Experiment Station.

Although tularemia and yato-byo are caused by the same organism, the records of the two diseases are quite different, for the death-rate from yato-byo is zero. Dr. Ohara ascribed this not to a lower virulence on the part of the bacterium, but to "the constitution of the Japanese." The Japanese malady is carried only by wild rabbits, whereas in America tularemia is carried by many other species of rodents, and is also transmitted by the bite of blood-sucking insects and arachnids, such as the horsefly and wood ticks.

Cancer Caused by Viruses

CANCER, at least of certain types, is caused by filterable viruses, and thereby joins a numerous and varied group of human ills including smallpox, influenza and infantile paralysis: such is the conclusion toward which points the evidence presented to the meeting.

Three converging lines of evidence were presented by Drs. James B. Murphy and Albert Claude of the Rockefeller Institute for Medical Research, by Drs. Jacob Furth and Elvin A. Kabat of Cornell University Medical College, and by Dr. F. Duran-Reynals of Yale University.

Fluids from malignant transplantable tumors of chickens were whirled in the ultra-centrifuge, passed through fine-pored filters, and otherwise treated after the manner of virus-containing fluids in known animal and plant diseases. Materials obtained from these cancer-fluid filtrates, injected into the tissues of healthy chickens, produced typical cancerous growths.

In the researches reported by Dr. Duran-Reynals, chicks responded to doses of a tumor virus by developing fatal hemorrhages and degeneration of tissues, without the development of tumors. However, extracts obtained from such chicks produced the characteristic growths when injected into healthy adult fowls.

Similar evidence for virus causation of cancers in rabbits was reported in communications by Dr. Jerome T. Syverton of the University of Rochester and Drs. John C. Kidd and Peyton Rous of the Rockefeller Institute. A virus was indicated as the probable cause of kidney cancer in frogs, by Dr. Balduin Lucké of the University of Pennsylvania.

Fever From Monkeys

AFRICAN monkeys may become immune carriers of yellow fever without being bitten by mosquitoes, was the warning that came from London in a paper by Drs. G. M. Findlay and F. O. MacCallun. They introduced yellow fever virus artificially into the stomachs of monkeys, and found that it retained its virulence. Other animals, including man, could not be thus converted into carriers. Apparently the high acidity of their gastric juices inactivated the virus.

"If non-biting arthropods with a long life span carry yellow fever virus and are occasionally eaten by monkeys, a solution would be found of the continuance of yellow fever in dry seasons when mosquitoes are absent or rare, the London researchers pointed out. "Attention is drawn to the survival of yellow fever virus in cockroaches."

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ENGINEERING

New Instrument Aids in Making Airplanes Safe

See Front Cover

IF THERE is moisture in the supposedly dry annealing gases, high-carbon steel decarburizes and becomes unsatisfactory for many uses. Airplane gears made when the moisture was present will not stand up in service.

The portable dew-point potentiometer shown on the front cover of this week's SCIENCE NEWS LETTER was devised by General Electric engineers to detect such damaging moisture.

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GENERAL SCIENCE

Genetics Congress Members Find They Are "Entangled"

AMERICANS at Edinburgh's war-clouded International Genetics Congress found themselves literally entangled when Scottish soldiers strung barbed wire around their dormitory.

Explanation: Dormitory would be needed after Americans left, for interning Germans.

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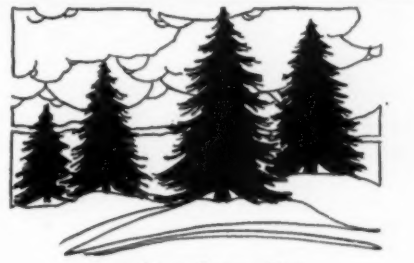
A new device tests the smoothness of a metal or painted surface, detecting variations as slight as one millionth of an inch.

ECOLOGY

NATURE RAMBLINGS by Frank Thone



Treeline Stays Put

IF THE American climate is changing, the timberline trees of the northern Rockies have not found out about it yet. Their "farthest up" seems to be neither advancing nor retreating, studies by Prof. Robert F. Griggs of George Washington University indicate.

Prof. Griggs' earlier investigations in Alaska showed that the northern boundary of the forest, at Kodiak, is actively migrating into the Arctic. He therefore wanted to know whether mountain trees in more southerly latitudes were showing a corresponding tendency to venture higher upslope.

Presence of large numbers of young trees in certain parts of the mountains had given rise to reports that such was the case. Closer investigation, however, disclosed fallen trunks of much larger trees, usually charred, among the younger growth. The young trees therefore are only replacements, following fire or other devastation. The mountain treeline is not advancing.

Timberline trees sometimes achieve great age, Prof. Griggs reports. In the Teton mountains, at about 10,000 feet elevation, he found an erect whitebark pine with a girth of nearly twelve feet. Estimates based on known growth rate give an age of about 1,800 years for such hardy giants as this.

The familiar alternation of timbered and bare strips running straight up mountain slopes Prof. Griggs relates to snow accumulation in the ravines. Trees do not thrive in the moist ravines, as might at first thought seem likely. They follow the ridges instead. This is because the deep snow masses in ravines, by sliding and creeping, tear out most of the young trees that sprout there during the summer. On the ridges, however, there is less snow and therefore little sliding, so that trees can survive.

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*First Glances at New Books

Chemistry—Physics

HANDBOOK OF CHEMISTRY AND PHYSICS, 23d ed.—Charles D. Hodgman, ed.—*Chemical Rubber Pub.*, 2221 p., $6 (deluxe), $3.50 (regular). Each year this widely-known and used reference work gets better and bigger and the current edition is no exception. A slightly larger page size gives the book bigger margins and better proportions. Additions and revisions include: Melting and boiling point index of organic compounds, ionization potentials, potentials of electrochemical reactions, the elements, isotopes, definitions of chemical terms, composition and value of foods.

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Ornithology

BIRDS OF THE MIDWEST — Dietrich Lange—*Webb*, 67 p., 25c.

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Ecology

BIO-ECOLOGY — Frederic E. Clements and Victor E. Shelford—*Wiley*, 425 p., $4.50. It is a perennial scandal of ecology that its practitioners belie their professions: ecology purports to tell the whole story of life in its relations to its environment; and behold, we have plant ecologists and animal ecologists, but no straight out-and-out ecologists. This book, however, represents both a recognition of this impossible situation and a major effort to remedy it: its authors are recognized leaders in both divisions of the field of ecology. May the symbiosis endure and become ever closer!

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Ichthyology

THE MIGRATION AND CONSERVATION OF SALMON—Forest Ray Moulton, ed.—*Science Press, Published for the American Association for the Advancement of Science*, 106 p., $2. A symposium, participated in by eight leading biologists who have given special attention to the problems of the salmon fisheries. A particularly interesting feature is a verbatim report of a conference held under the auspices of the Fisheries Research Board of Canada.

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Paleontology

SOME MEMORIES OF A PALEONTOLOGIST—William Berryman Scott—*Princeton Univ. Press*, 336 p., $3. Delightfully told reminiscences of a scientist who remembers Princeton undergraduate life in the sixties, German student life in the seventies, and many landmark events in scientific history. It is not often that an eminent man of science settles back to confide his life story to the interested reader in so frank and pleasing a manner.

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Forestry

FORESTRY AND LUMBERING—Josephine Perry and Celeste Slauson—*Longmans, Green*, 127 p., $1.50. A simple and short, but clear and comprehensive, account of America's timber industries designed for use in the grade schools. In a time when a wise and adequate national forest policy is a crucial necessity, it is especially desirable to have the citizens of tomorrow informed on the essentials of the subject.

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Evolution

HOW FATHER TIME CHANGES THE ANIMALS' SHAPES — Gaylord Johnson — *Messner*, 185 p., $2. A new book on ancient life, by one of the top writers of popular science, who has a special flair for ancient things. The author maintains his usual vivid style and ingenious analogies, and the illustrative sketches are up to previously established high standards.

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Plant Physiology

PLANT PHYSIOLOGY—Bernard S. Meyer and Donald B. Anderson — *Van Nostrand*, 696 p., $4.50. A new and up-to-date text in plant physiology, in which due consideration is given to the more recent advances in the science, such as plant hormones, auxins and trace elements, as well as to the more effective and correct presentation of longer-known facts.

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Meteorology

PHYSICAL AND DYNAMICAL METEOROLOGY (2d ed.) — David Brunt — *Cambridge (Macmillan)*, 428 p., $6.75. Only five years has elapsed since publication of the first edition of this fine and exhaustive treatise on the weather and the mathematics which govern its behavior. The book is coming to be the standard textbook in its field for postgraduate students.

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Ethnology

WAR CEREMONY AND PEACE CEREMONY OF THE OSAGE INDIANS — Francis La Flesche—*Govt. Print. Off.*, 280 p., 35c. (Smithsonian Institution, Bureau of American Ethnology, Bulletin 101)

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Education—Psychology

FOUNDATIONS OF EDUCATIONAL PSYCHOLOGY—Peter Sandiford — *Longmans, Green*, 464 p., $3.25. The first of a projected series of textbooks from the University of Toronto designed to give the student a general survey of this field. The field of this book is parallel to that called by Dr. Thorndike the "Original Nature of Man," discussing such matters as heredity and environment, individual differences, glands, reflexes, intelligence and personality.

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Psychology—Education

CORRECTING NERVOUS SPEECH DISORDERS—Mabel Farrington Gifford—*Prentice-Hall*, 197 p., $2.85. A textbook for speech therapists and teachers of remedial speech "bringing into focus the technique for the correction of stammering that is practised in the California public schools."

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Mathematics

ELEMENTS OF THE TOPOLOGY OF PLANE SETS OF POINTS—M. H. A. Newman—*Cambridge (Macmillan)*, 221 p., $3.50. Here is a book on advanced mathematics for the expert by a fellow of St. John's College, Cambridge University, England.

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Chemistry

INORGANIC SYNTHESES, Vol. I—Harold Simmons Booth, ed.—197 p., $3. The newest methods of inorganic synthesis are here compiled from the writings of many authors in a volume edited by Prof. Booth. A "must" book for students in this field.

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Chemistry

INTRODUCTORY COLLEGE CHEMISTRY (3d ed.)—Harry N. Holmes—*Macmillan*, 619 p., $3.50. This book is a third edition of the text prepared by Oberlin's professor of chemistry. It is designed for the teacher who wishes a book somewhat shorter and less difficult than the author's well-known "General Chemistry."

Science News Letter, September 16, 1939

Sociology

SOCIAL RESEARCH — Manuel Conrad Elmer — *Prentice-Hall*, 522 p., $3. A book intended to present various methods of approach to social problems and to indicate the type of inquiry to which these methods may most effectively be applied.

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